

REMARKS

Claims 1-3 and 5-7 are all the claims pending in the application. Claims 1-3 have been examined. Claims 5-7 are added by this Amendment. Claim 4 is cancelled by this Amendment. Reconsideration and allowance of all the claims are respectfully requested in view of the following remarks.

PERSONAL INTERVIEW

Applicant thanks the Examiner for the courtesy extended to its representative during the personal interview conducted on July 14, 2004. During the interview, the Examiner stated that it is his position that because claims 1 and 4 are apparatus claims, the prior art does not need to specifically teach the “substantially on a level” or “ $\pm 5\text{mm}$ ” limitations of claims 1 and 4 so long as the prior art apparatus is *capable* of performing within that range. The Examiner suggested that Applicant may be able to overcome the Examiner’s rejection by defining the Applicant’s invention as a method rather than an apparatus.

NEW CLAIMS

Claims 5-7 have been added by this Amendment.

AMENDMENTS TO THE CLAIMS

Claims 1-3 have been amended to more thoroughly define the invention of the present application.

CLAIM REJECTIONS

The Examiner rejected claims 1-4 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,193,132 to Shibata *et al.* (“Shibata”) in view of U.S. Patent No. 6,337,489 to Matsumoto *et al.* (“Matsumoto”). Applicants respectfully traverse this rejection as the references fail to establish *prima facie* obviousness for at least the following reasons.

A. The Examiner Has Not Provided Support For His Position.

While Applicant appreciates the Examiner's position, i.e., that Shibata and Matsumoto must only be *capable* of performing with the range recited in the present claims, the Examiner has not provided any support for his position. Therefore, Applicant respectfully submits that the Examiner has not met his burden of establishing *prima facie* obviousness.

B. The Combination of Shibata and Matsumoto Fail to Render Claims 1-3 Obvious.

1. Claim 1

a. Shibata and Matsumoto Fails to Teach or Suggest All the Elements as Set Forth in Claim 1.

Claim 1 sets forth a bonding apparatus having a chip recognition camera disposed to be lower than a level of a substrate mounting surface of a substrate stage to thereby recognize a chip held by a bonding tool from a position below the chip, wherein a control device has moved the chip so that the chip recognition camera recognizes a lower surface of the chip when the lower surface of the chip is located substantially on a level with a chip bonding surface of the substrate.

In Shibata, the chip picked up by the bonding tool 12 is recognized by the first recognition camera 14, and thereafter the provisional bonding is performed based on the recognition result. Then, the reference mark of the substrate and the chip are detected by the second recognition camera 16 to seek the positional relationship between the substrate and the chip. This is a teaching operation. *See* column 6, line 10 to 62. Thereafter, the actual bonding is performed, and finally a shift amount of bonding is detected to thereby judge OK or NG of the bonding operation. *See* column 6, line 63 to column 7, line 40.

In contrast to the present invention as set forth in claim 1, in Shibata's apparatus the lower surface of the chip is not located substantially on a level with a chip bonding surface of the substrate. Further, although the chip 13 is recognized by the first recognition camera 14 in

Shibata, it must judge OK or NG of the bonding due to bonding shift amount. Such judgment of the bonding inherently indicates that the bonding shift owing to the shift of the bonding axis (ball screw, guide, etc.) is necessarily caused as described in the background section of the present application. Shibata never teaches or discloses specific solutions to solve that problem. In other words, because Shibata gets errors in positioning, it does not inherently recognize the chip when the chip is in substantially the same plane as the bonding surface of the substrate.

Moreover, Matsumoto teaches a chip recognition camera 8 that recognizes a bonding surface of a chip 23. However, there is no teaching or suggestion as to where the chip 23 is located relative to the substrate 22 when recognized by the camera 8.

Further still, neither Matsumoto or Shibata teach or suggest a control device as recited in claim 1.

Accordingly, even assuming that one of ordinary skill in the art were motivated to combine Shibata and Matsumoto as suggested by the Examiner, any such combination would still fail to teach or suggest a chip recognition camera disposed lower than a level of a substrate mounted surface of a substrate stage, wherein a control device is configured to a bonding tool so that the chip recognition camera recognizes a lower surface of the chip when the lower surface of the chip is located substantially on a level with a chip bonding surface of the substrate, as set forth in claim 1.

**b. The Examiner Has Provided No Credible Motivation To
Combine the Teachings of Shibata and Matsumoto.**

In addition, the Examiner has not identified a credible motivation to combine Shibata with Matsumoto. There is no motivation to recognize the chip when the lower surface of the chip is located substantially on a level with a chip bonding surface of the substrate, as set forth in

claim 1, to eliminate the shift amount. Further, the Matsumoto reference in several instances refers to its disclosure as teaching a bonding apparatus with high precision. Col. 1, line 8; col. 1, line 47; col. 5, line 19. One of ordinary skill in the art would not be motivated to combine Matsumoto with Shibata because Matsumoto purports to teach a device for position a chip on a substrate with high accuracy. Whereas Shibata's invention is directed to detecting errors in position. Thus, modifying Shibata's device so as to be highly accurate runs at cross-purposes to Shibata's error detection invention. In fact, the Examiner's suggested modification of Shibata would destroy that invention.

c. The Examiner May Not Rely On Measurements From Shibata's Figures.

To the extent that the Examiner is relying on measurements from Shibata's figures, such is impermissible because there is no indication that the drawings are to scale. And proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale. When a reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. MPEP § 2125.

2. Claim 2

With respect to claim 2, a chip recognition camera configured to be focused on a certain position defines a specific structure. Specifically, it is a structural limitation on the focal length/range of the camera. As recited in claim 2, that focal length/range is defined with respect to other structural elements in the claim. Neither Matsumoto or Shibata teach a bonding apparatus having a camera with a structure, i.e., a focal length/range as recited in claim 2.

3. Claim 3

As claim 3 depends on claim 1, Applicant submits that claim 3 is patentable over Shibata and Matsumoto, alone or in combination, at least based on this dependency.

CONCLUSION

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.


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SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

23373

CUSTOMER NUMBER


Brandon M. White
Registration No. 52,354

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